HOW AMERICA'S GUNNERS HOLD THE SUPREMACY OF THE SEA

Hitting Targets Below the Horizon That the Gunners Never See; Practise with Real Torpedoes That Hit the Marks Over Two Miles Away

THE EYES OF THE GUNS.
Above Is the Ordnance Officer, who Sits in the Foretop and Directs by Telephone the Marksmanship of the Gunners Below.
At the Bottom of ...e Page Is the Crew of a Seven-Inch Gun of the Battleship Utah.

THAT American gunners are more efficient than ever, and that the submarine mine may be used effectively as a means of offense as well as one of defense, are two of the important facts brought out by the battle practise of the United States Atlantic fleet just completed off the Virginia capes.

Steaming at full speed the gunners found little difficulty in hitting targets at a range of 15,000 yards, a most remarkable achievement when it is remembered that at that distance the larger part of the target is below the horizon, leaving only the upper part visible. A little motion of the ship or the rolling of a fair-sized wave was sufficient to obscure the target entirely.

A year or so ago, indeed, Rear Admiral N. E. Mason, chief of the Bureau of Ordnance, reported that all systems of range finding failed at distances beyond 10,000, or at most 12,000 yards, and that as all the sources of inaccuracy at short ranges were exaggerated as the range increased, at 15,000 yards their cumulative effect was such as to make it doubtful whether a hit at that range could be regarded as anything more than a matter of luck, and it is a fact that the gunners of European navies regard it as a waste of effort to aim at a greater range than 7,000 or 8,000 yards.

Nevertheless, the records show that at 12,000 to 15,000 yards the battleship Utah made no less than nine hits, while the Michigan took second place with seven.

The secret of this achievement lies in the efficiency of the men behind the guns, on the bridge, in the engine room, and particularly of the fire control officer stationed in the cage-like masts, characteristic of American battleships.

The pictures on this page, taken during the battle practise, illustrate the system which enables our gunners to hit targets which are quite invisible to the naked eye, and which appear only one-quarter of their actual size through the most powerful telescopes available. As the targets are only twenty-four feet square the results obtained seem almost phenomenal.

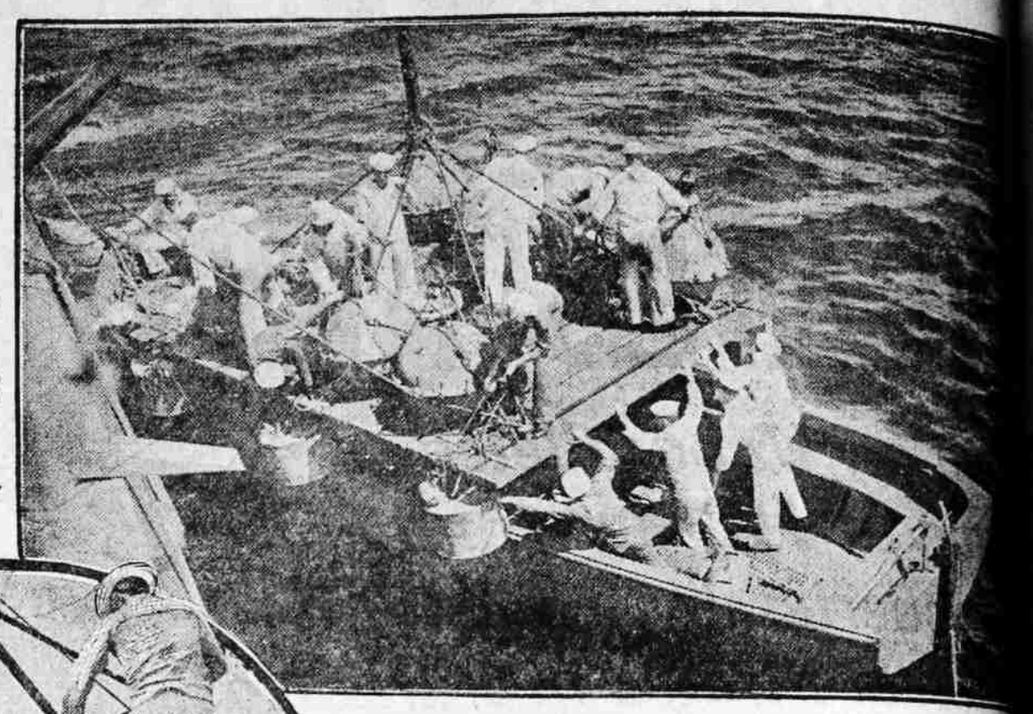
After the target has been located through the telescope a "ranging shot" is fired at a distance of some 16,000 yards. The fire control officer estimates as accurately as he can whether the projectile has gone too far or fallen too short, and by means of a telephone, by which he keeps in communication with the gun crew, reports his conclusions, and the second shot is based upon them. Every shot fired subsequently is similarly observed by the fire control officer, and the success of the tests depends largely upon the accuracy of his calculations.

The fleet, under the command of Rear Admiral Hugo Osterhaus, consisted of twenty-one battleships, including dreadnaughts, one armored cruiser, two scout ships, twelve colliers and one mine planter.

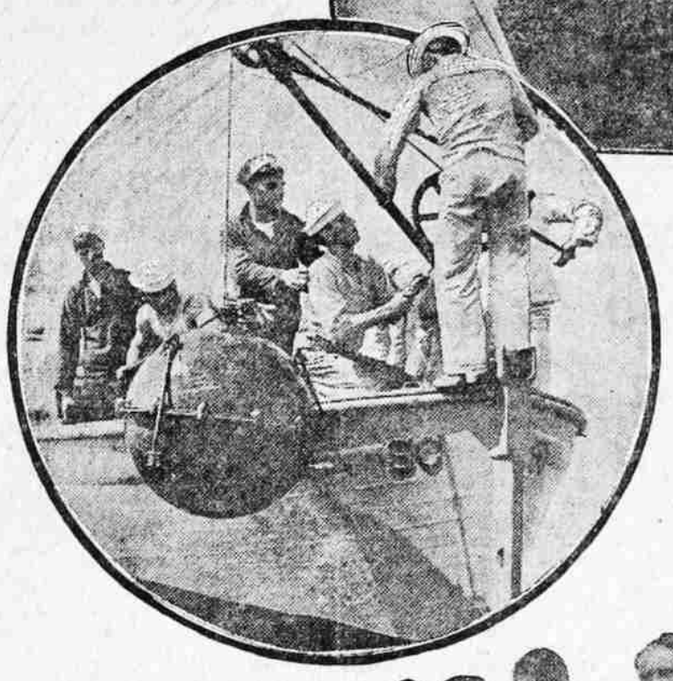
This last vessel is destined to play an important part in naval warfare of the future, for at the recent battle practise it was found that mines might be used most effectively against an enemy. Every battleship in the United States Navy now carries eighteen of them, and the mine-planting vessel carries a reserve stock of four hundred.

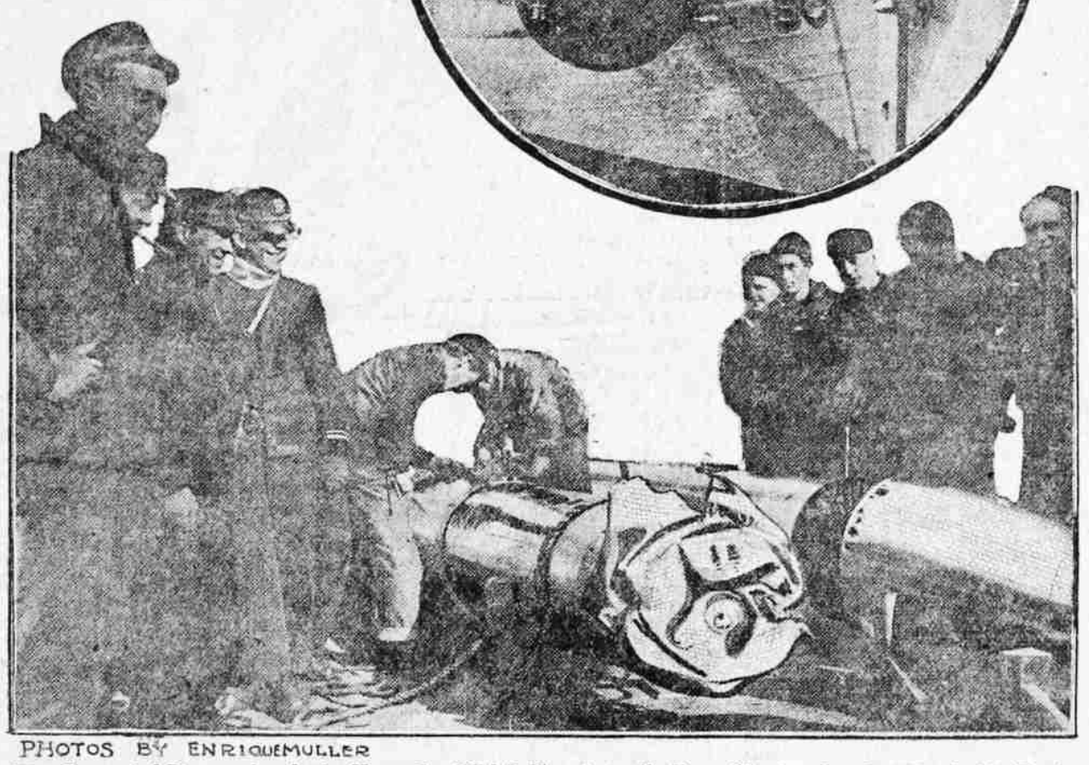
These mines are hollow iron spheres about four feet in diameter and contain a big charge of gun-ton and other high explosives. As soon as a vessel comes in contact with them a cap on top explodes the contents of the mine, which is powerful enough to disable any battleship afloat.

They are submerged about five feet below the the surface of the water, about eighteen feet apart. So expert have our sailors become in planting them that eighteen can be placed in a minute.



Placing the Mines from the Bow of the Cutter.

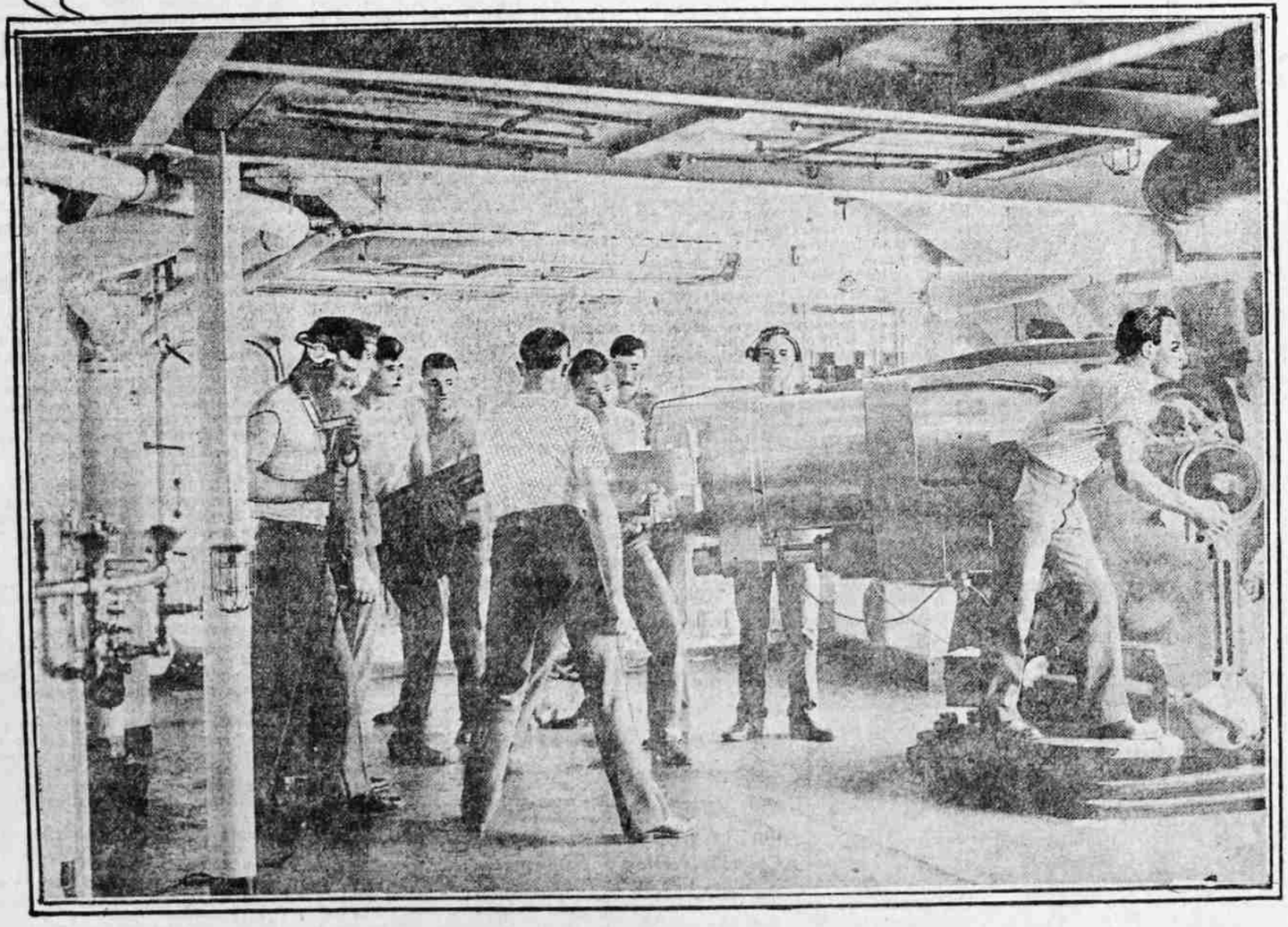




PHOTOS BY ENRIQUEMULLER

The Crumpled Dummyhead of a Torpedo, Which H as Actually Been Fired at Another Battleship During the Gun Practise.

Lowering a Pontoon Raft Loaded with Contact Mines from ... Battleship Carolina to the Ship's Cutter.



Contact mines have been in use for years as a means of defense for harbors, but it is now purposed to place them in the sea during a naval engagement, and to govern the course of the conflict in such a manner that the enemy will be either driven or lured into their vicinity. By international agreement, however, all mines so used must be of a pattern that will sink one hour after being planted.

Great work was done with torpedos, too. Each vessel had two tries, and at a range of 3,800 yards the Delaware got two hits, while the Florida got one. For the purpose of these tests dummy torpedo heads were used. Some of them, battered and bent, are shown in the illustrations.

Battle practise is an annual feature in the American navy. The ship making the best record receives what is known as the trophy pennant, consisting of a black circle on a red ground. In addition to this every member of the crew gets a permanent increase in salary, and the members of the gun crew get medals in addition.

Last year the Michigan won the championship, but it now goes to the Utah. The Delaware, the Michigan, the New Hampshire and the Rhode Island made excellent scores, and were not very far behind the winner. Those ships which did not do so well were handicapped by weather conditions or unsuitable materials.

Last year the skill of American gunners was put to a more practical test than is afforded by the square targets ordinarily used. The old battleship Texas, renamed the San Marcos, was used as a target in Chesapeake Bay, the New Hampshire being selected to do the firing, the object being to show the value of the "spotting" system, to give information as to the effect of modern gun fire on an armored vessel and to settle some vexed questions concerning the flight of projectiles and their angle of impact.

The San Marcos's protection consisted of a partial 12-inch steel belt, 12-inch armor on bulkheads, turrets, redoubt and conning tower, 6-inch on the ammunition hoists and a 3-inch deck. Each salvo fired consisted of four 12-inch and four 8-inch shots.

"The results of the firing," declared the Secretary of the Navy, "have furnished us with the most valuable information on the important questions that arise in the consideration of the preparedness of the fleet for actual battle.

"The firing has conclusively proven that our system of training is the best, and the total wreck of the San Marcos has impressed every observer of the accuracy of fire and the destructive features of our projectiles.

"As the practise was primarily for the education of spotters in estimating the errors in range at distances of five to seven miles, it was intended to have the salvos so placed that few projectiles would hit the vessel, so that we might use her again next year for spotting practise.

"Almost all the salvos were fired so that they would fall at varying distances for the education of the spotters, but in order to observe the fire of our projectiles on an actual armored vessel a few of the salvos were directed at the target itself, and we got a great many hits from these salvos. I noticed on one salvo that four 12-inch projectiles fell in a bunch, all of them striking the vessel and causing dreadful havoc.

"The New Hampshire placed the salvos anywhere she wanted, and when the gunners wished to have some hits on the conning tower and the turret armor, in order to observe the effect, they had no trouble placing the shots at from 10,000 to 12,000 yards range at just the point desired.

"A few projectiles were ... against the masts, so as to ... what would happen to the ... communication systems. An ... tion of the vessel after firing ... the immense holes which had ... ploughed through from one ... the other, many of them being ... water, and any one or two of ... being sufficient to make the ... a total loss. The armor of the ... eel was unable to withstand the ... pact at the very great ... which we fired, and the ... was a total loss after the first ... salvos were directed at her.

"All the officers of the fleet ... deeply impressed with the ... and the great destructive ... the projectiles. All the ... which were placed at the ... resenting the crews were ... cut to pieces, and the fumes ... left by the passage of high ... projectiles would have ... every living thing.

"The bulkheads in places ... like sieves, due to the action of ... explosives, and all the compart... below were completely riddled. ... was remarkable to note the ... mous power of some of these ... tiles, which, at 12,000 yards, ... right through the heaviest ... and continued their work of ... tion inside the vessel.

"This practise has demonstrated beyond doubt the immense ... the long-range firing we have ... having for the last two years, ... shows that our methods of ... are positively the best.

"Our officers have seen all ... practises against the canvas ... screens, and have been ... satisfied with the work of our ... pointers and fire control parties. ... it needed just such an exhibition ... this to prove that their enthusiasm ... and continued efforts to bring ... fleet to the highest state of ... battle efficiency have met with ... tire success. The spotters have ... the first time gained the necessary ... information which cannot be ... by firing against anything but a ... vessel."

This test, in connection with ... more recent work of the gunners ... Chesapeake Bay a few weeks ... indicates that no enemy would ... proof against American guns ... where within a radius of nine ...

Living Ink Bottles All Along New England's Coa...

ALONG the rocky shores of New England is much indelible ink. It is better than any that can be bought—a beautiful crimson in color, and when applied to fabrics absolutely unchangeable.

This ink is contained in little bottles put up by Nature herself—the receptacles in question being certain whelks, or sea snails, of the species known to science as purpura lapillus. If the shell of one of these whelks be broken, there will be found, just under the skin of the back, a slender whitish vein containing a yellow liquor. The latter, when applied to linen with a small brush and exposed to the sun, turns first green, then blue, then purple, and finally a brilliant crimson. Nothing will wash it out.

Lest it be supposed that the notion of obtaining dyes from marine mollusks is at all new, it is worth explaining that the famous Tyrian purple, used by the ancients, which is the most famous of all dyes... got from two species of sea ... This color was deemed too ... for any but royalty and the ... in the days of Imperial Rome ... cost of one pound of wool dyed ... it being $175.

The dye was separated ... tedious process, the whelks ... pounded in a mortar, and the ... thus obtained diluted with a ... of water and urine. Thus was ... duced what would be called ... "purpurate of ammonia," which ... applied to wool gave to the ... the most beautiful color ... changing from metallic green ... ple in different lights.

Such was the celebrated ... purple of the ancients. A ... simpler and cheaper method ... ducing it, from guano, is now ... stood—though it is still known ... mercially as "murexide," after ... Latin name of the mollusks ... which the stuff was originally ... rived. A glance at any good ... ary, under the word "murex," ... lend brief but interesting ... tion to the statements here given.